

*THE EFFECTS OF FORM TRAINING ON
FOUL-SHOOTING PERFORMANCE IN MEMBERS OF
A WOMEN'S COLLEGE BASKETBALL TEAM*

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The effects of instruction and feedback in proper form on foul-shooting performance was evaluated in 3 players of a women's NCAA Division II college basketball team. Players showed an increase in percentage of shots made and in correct form compared to baseline shooting without instruction or feedback. All players reached criterion within seven training sessions. The results suggest that training proper form is an effective strategy for improving foul-shooting performance.

DESCRIPTORS: sports, athletic performance, basketball, skill training, behavioral coaching

In various sports settings, researchers have demonstrated changes in athletic performance with the application of behavioral coaching procedures. Such procedures typically involve performance-based consequences, skill training, or both. For example, remediation of errors was one component of a behavioral coaching technique that effectively enhanced skill acquisition in football, gymnastics, and tennis (Allison & Ayllon, 1980). Similarly, error correction was combined with differential consequences to decrease errors in components of swimming strokes (Koop & Martin, 1983).

The purpose of the present study was to evaluate the effectiveness of form training on foul-shooting performance and proper shooting form.

METHOD

Participants, Materials, and Setting

Three members of a women's NCAA Division II college basketball team voluntarily

enrolled in the study between seasons to improve their foul-shooting performance. All participants were 19 to 20 years old and played for the same team with the same coach the previous season. Participants 1, 2, and 3 played primarily point guard, guard, and point guard, respectively. Only Participant 3 started the season before the intervention. Participants 1 and 3 were starters the season following intervention. All sessions were conducted on an official NCAA basketball court using an official women's NCAA basketball. Both baskets were used and were counterbalanced across sessions. A videocamera was used to record sessions.

Dependent Variables

Two dependent variables were evaluated for each participant. First, the percentage of shots made was calculated for each 10-shot session. Each shot was recorded as made or missed. A made shot was defined as one in which the basketball fell through the hoop without making contact with the backboard. A shot was not counted as made if it hit the backboard before falling through the hoop. This stringent definition of a made shot was used during the study to eliminate the effects of the backboard on shot performance and

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Table 1
Form Training Description

Component	Description
Feet	<ol style="list-style-type: none"> 1. Place shooting foot (same side as shooting hand) as close to the foul line as possible while remaining behind it (vertical position) and stand at the center of the foul line as indicated by dot in the center of all foul lines on regulation basketball courts (horizontal position). 2. The balls of both feet should maintain contact with the floor from before the shot until the ball reaches the basket. 3. Keep feet in approximately the same location and position for every shot.
Head	<ol style="list-style-type: none"> 1. Look up toward basket rim before shooting. 2. Head should remain in about the same position throughout the shot with no obvious tilting up of the head after the shot leaves the hand and before the shot arrives at the basket (indicating the participant is watching the ball travel to the basket rather than watching the basket rim).

to elucidate the relation between proper form and shot performance. Second, the percentage of shots taken with correct form was calculated for each player in each session. Components of correct form were identified as those most consistently mentioned as essential for accurate foul shooting in a number of basketball training manuals (Bell, 1964; McGuire, 1958). During the first two sessions of baseline, the experimenter observed each participant's form while she was shooting the basketball from the foul line, and identified one of the form targets that was not correct according to the description in Table 1. All 3 participants showed incorrect form for either feet or head.

Data Collection and Measurement

Each day, participants shot 10 times from the foul line. These 10 shots comprised the daily session. Between three and four sessions were conducted per week. The per-

centage of shots made and percentage of those shots (trials) with correct form were calculated for each participant in each session. Direct observation data were scored daily by the experimenter (the first author). Following each shot, the experimenter recorded whether the shot was made and scored the participant's form as either correct or incorrect. The participant waited until the experimenter looked up after recording the outcome of the shot, then verbally informed the experimenter whether she made or missed the shot. The experimenter recorded the participant's report in the interobserver agreement column on the data sheet. Point-by-point agreement for made shots was calculated for 60% of all sessions for all participants and was 100% for all sessions for all participants. In addition, two of every five sessions were randomly selected and videotaped. A graduate student independently recorded direct observation data for form from the videotapes and calculated interobserver agreement. Exact agreement for correct form was calculated for 40% of all sessions. For all variables and participants across all conditions, agreement was 100% with only four exceptions. Agreement was never less than 90% in those four sessions.

Design

A multiple baseline across participants design was used to evaluate the effects of form training on percentage of shots made and on percentage of trials with correct form. The 1st participant to demonstrate a stable baseline pattern in percentage of shots made across sessions received training first. The participant had to meet criterion for improvement for three consecutive sessions before training was initiated with the next participant. The criterion was defined for each participant as a minimum 10% increase above her baseline mean percentage of shots made.

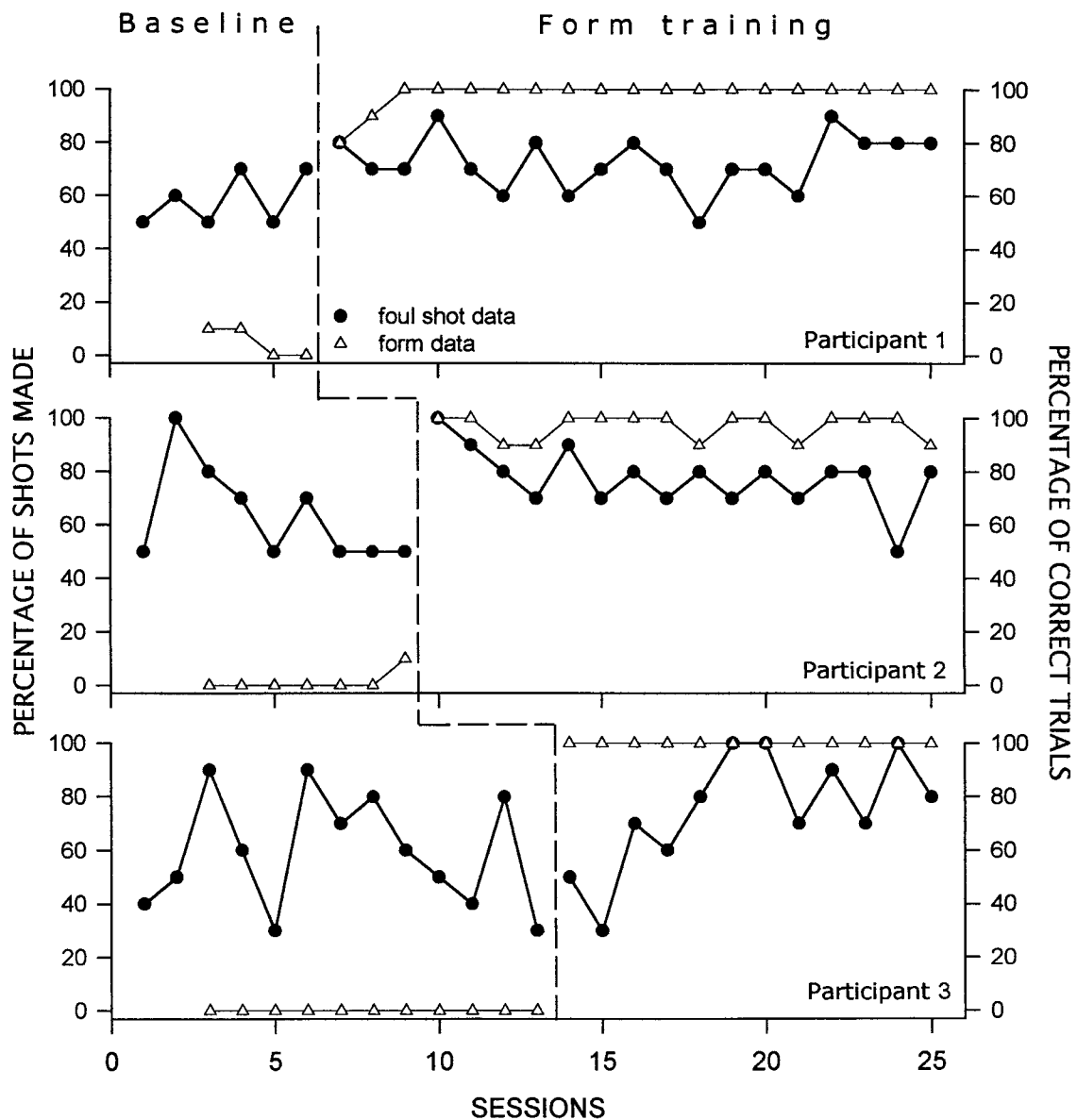


Figure 1. Percentage of shots made (filled circles) and percentage of shots taken with correct form (open triangles) across sessions for each participant.

Procedure

In all conditions, the first thing each participant did during the session was to shoot the basketball 10 times from the foul line. The data for these 10 shots were calculated, graphed, and referred to as a session. The experimenter did not provide any performance feedback during the shots. After these

10 shots (each session), the session either ended (i.e., after baseline sessions) or participants underwent form training practice.

Baseline. After taking 10 shots from the foul line, the session ended.

Form training. These procedures began immediately following the last baseline session (i.e., the same day). After taking 10

shots from the foul line, participants were provided with instruction in proper shooting form. Instruction began with a verbal review of the description of proper form (Table 1). After the verbal review, the participant was directed to take 10 practice shots. If the participant made a practice shot, the experimenter provided descriptive praise pertaining to proper form. For example, the experimenter said, "Good job keeping your feet in the same position throughout the shot." No corrective feedback was given on improper form. If the participant missed a shot, the experimenter reviewed the description of proper form. If a participant appeared to meet all criteria for proper form but missed a shot, feedback was identical to that used for made shots.

RESULTS AND DISCUSSION

Percentage of shots made and percentage of shots with correct form in each session for each participant are shown in Figure 1. In the first session of intervention, all participants displayed immediate improvements in correct form; by the third, all participants showed 100% correct form. Although Participants 1 and 3 maintained this performance throughout the intervention, Participant 2's form varied between 90% and 100% correct. In baseline, the mean percentage of shots made across baseline sessions was 58.33%, 63.33%, and 59.23% for Participants 1 through 3, respectively. Within seven or fewer sessions of intervention, all participants' performance improved to criterion and subsequently sustained a mean performance of at least 72% accuracy (72.63%, 73.56%, and 75% for Participants 1 through 3, respectively). In the season before intervention, the mean number of shots made by the participants ($M = 40$, 18 shots made of 45 taken) was below the mean of

the rest of the team ($M = 54.5$, 156 of 286). In the season following intervention, the mean of the 3 participants ($M = 60.4$, 32 of 53) was similar to the mean of the rest of the team ($M = 59$, 245 of 415).

The results showed that specific training and feedback in proper form produced improvement in both athletic form and performance. The simultaneous increase in percentage of trials with correct form and percentage of shots made implies that the consistent use of correct form is linked to accuracy in foul shooting. This increase suggests that form training provided a direct method for the specification and individualized feedback related to proper form necessary for accurate foul shooting. However, the present study did not allow us to fully determine the relation between the percentage of overall correct form and percentage of shots made, because only a single aspect of form was targeted for each subject. These findings may be the result of contingent reinforcement in the form of either performance feedback or made shots, stimulus control of the naturally occurring stimuli on the basketball court (e.g., the basket, the dot on the foul line), instructional control of the experimenter, or some combination of these.

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